

ROBERTS *Jno. B.*
Acknowledged

EXPLORATORY INCISION IN THE
TREATMENT OF CLOSED FRAC-
TURES AND DISLOCATIONS.

BY

JOHN B. ROBERTS, M.D.,

OF PHILADELPHIA, PA.;

PROFESSOR OF SURGERY IN THE PHILADELPHIA POLYCLINIC, AND THE
WOMAN'S MEDICAL COLLEGE OF PENNSYLVANIA.

FROM

THE MEDICAL NEWS,

January 16, 1897.

LIBRARY.
SURGEON-GENERAL'S OFFICE.

JUN 29 1908

817

[Reprinted from THE MEDICAL NEWS, Jan. 16, 1897.]

**EXPLORATORY INCISION IN THE TREAT-
MENT OF CLOSED FRACTURES AND
DISLOCATIONS.¹**

By JOHN B. ROBERTS, M.D.,
OF PHILADELPHIA, PA.;
PROFESSOR OF SURGERY IN THE PHILADELPHIA POLYCLINIC,
AND THE WOMAN'S MEDICAL COLLEGE OF
PENNSYLVANIA.

COMPLETE reduction, exact restitution of contour, and perfect retention, are the conditions of full success in the treatment of fractures. Deformity, impairment of articular movement, non-union, and neuralgic pain are remote results of failure to obtain these desirable conditions. Since aseptic surgery has made possible the prevention of infective inflammations in most open fractures, it is quite probable that better reduction, coaptation, and retention result in open than in closed fractures of the same grade and character of bony lesion.

The recent application of skiagraphy to surgical diagnosis has proved that fractures seemingly well reduced and properly dressed with splints may be the seat of considerable deviation from the normal skeletal relations. At the Polyclinic Hospital recently, for example, a fracture of the middle of the radius, supposed to be well reduced and dressed, was shown, by the use of the Röntgen ray, while the splints were in position, to have its fragments overlapping to the extent of about half an inch. In another case a painful swelling at the seat of a former injury to the fibula

¹Prepared for the Second Pan-American Medical Congress, November, 1896.

LIBRARY.
SURGEON GENERAL'S OFFICE.

JUN 29 1908

817

was discovered to be due to unrecognized non-union at that point. The rigidity of the tibia prevented the lack of union of the smaller bone being detected, but skiagraphy showed it plainly.

Nearly twelve years ago I advocated conversion of closed fractures of the cranium into open fractures by incision of the scalp, whenever uncertainty as to the character of the cranial lesion was prejudicial to intelligent treatment.¹ As part of my argument I said that no surgeon would hesitate to convert a closed recent fracture of the thigh or leg into an open one if it were impossible to replace fragments which were threatening life. I admitted that closed wounds are less serious than open ones, but asserted that with modern surgical methods, open wounds are preferable to closed wounds having inherent dangers that cannot be recognized without opening them. Further consideration and experience convinced me that this method should be extended to fractures in the limbs, even when life was not threatened, if obscurity of lesion or difficulty in reduction jeopardized function. Accordingly, a few years later,² I gave it as my opinion that recent fractures of the lower end of the humerus might with propriety be subjected to exploratory aseptic incision, if satisfactory coaptation was not obtainable under anesthesia; and that such action, though it involved opening the elbow joint, was as legitimate in properly selected cases as the recognized exploratory incision made in obscure abdominal conditions.

My belief in the propriety and value of exposure of the fragments in a certain limited number of closed fractures has been strengthened as years have passed.

The method, which I do not claim as novel, has, however, not been sufficiently impressed upon the profession to cause its adoption by surgeons in general. Allis of Philadelphia has advocated it³ in rebellious fractures of the upper third of the shaft of the femur, in order to apply steel screws for retentive purposes. In England, Lane has employed it⁴ in oblique fractures of the tibia and fibula near the ankle, for the same reason. McBurney⁵ and others have resorted to it in fracture of the upper end of the humerus complicated with dislocation. Dennis⁶ and Ricard⁷ also approve of it in cases where there is difficulty in obtaining correct apposition of fractures. Other writers may have mentioned the subject, and cases may have been occasionally reported; but, except in fractures of the cranium and patella, I think that most surgeons are more apt to be satisfied with imperfect results than to advise immediate exposure of the fragments before the patient comes out of the anesthesia induced for the purpose of examining and reducing the fracture.

This attitude of the profession in general has been evident in societies at which I have incidentally mentioned my views;⁸ and is due to conservatism bred by the fear of open fractures felt by all in the pre-antiseptic period of surgery. The method has suggested itself to many practical surgeons, but it needs to be ever before our minds as a legitimate procedure.

My advocacy of cutting down upon closed fractures is limited to cases in which ignorance of the exact lesion, impossibility of reduction, imperfect immobilization, or failure to deal efficiently with complicating lesions makes the incision the less of

two evils. An aseptic incision is almost devoid of risk, even if it opens a joint; but that slight risk should not be added to the patient's burdens unless the probability of deformity, of interference with joint movements or other functions, of pain, of paralysis, or of non-union justify it. Here, as in all departments of surgery, it is the surgeon's duty to exercise care and good judgment in selecting the method of treatment. To illustrate my meaning I cite fracture of the patella, which I have never treated by incision and suture of the bone, because I have thus far always been able to satisfactorily bring the fragments together by hooks, subcutaneous suture, or splint. In one or two instances I have almost decided to lay open the overlying tissues in order to obtain approximation by direct appliances, but I have finally not been obliged to do so. The open operation I believe to be legitimate, and probably needful in a very few selected cases, but I am opposed to it as a routine treatment.

It is self-evident that the wound exposing a fracture must be aseptic, and that the operator who adopts incision must be familiar with the steps to be pursued at the inception of infective inflammation. A man who will hesitate to reopen the wound or drain the joint, at the moment septic premonitions show themselves, should associate a more energetic surgeon with himself in such operative treatment of fractures. The risk of incising muscles and opening joints, if done in an aseptic manner by an operator familiar with truly aseptic and antiseptic surgery, is unquestionably very slight. Primary

union without disturbance of joint-function will be almost universal.

If it once be admitted that the seat of a fracture can be exposed by incision, with little or no risk to life, there are many advantages that will at once suggest themselves:

1. The exact lines of separation can be seen, and the significance of lines of comminution in relation to subsequent reconstruction can be fully appreciated.

2. Coaptation need no longer be guessed at by the sensations imparted to the examiner's fingers, separated as they are from the bone by varying thicknesses of muscle, fat, and skin; nor need it be dependent upon the possibility of having conveniences for taking a skiagraph.

3. The fragments can be accurately fitted together, torn periosteum replaced, and muscular and fascial bands, nerves and muscles disentangled from undesirable positions between the pieces of broken bone. This prevents deformity by permitting restoration of normal contour of the limb, and lessens the occurrence of non-union, neuralgia, atrophy, and ankylosis.

4. When the osseous, muscular, and vascular relations have been restored, they can be perfectly maintained by the application of sutures, pegs, nails, screws or ferrules to the bone, and sutures or ligatures to the muscles, nerves, and vessels.

5. The pain, due to extravasation of blood, rapid inflammatory exudation or traumatic synovitis, is relieved by the removal of the clots and leaking out of exudation and synovial fluid. The interstitial pressure caused by extravasated blood and exudate has often heretofore caused surgeons to split the skin and

deep fascia by long incisions, in very bad fractures, in order to avert threatened gangrene. A similar relief of tension in less urgent cases will undoubtedly lessen pain and suffering, though such operative treatment would ordinarily not be adopted. The incisions employed to uncover the fractures are therefore indirectly of value as relievers of pain.

6. Pain is also lessened, in the few cases requiring direct retentive apparatus, because the sutures, nails, or screws prevent motion between the fragments better than external splints. Muscular spasm or incautious movement has therefore little opportunity to cause suffering.

7. Fat embolism is probably less likely to occur in fractures liable to its occurrence, if early escape for the fatty *débris* is permitted by incision.

8. Ankylosis from faulty position of fragments, irregular formation of callus due to stripped up periosteum, and gluing down of tendons, will seldom occur after the fracture has been disclosed to the scrutiny of a competent surgeon.

9. Repair of the broken bone and functional restitution of the surrounding tissues occur more rapidly than when coaptation is imperfect, or when damaged, muscular and other structures are left to the unaided efforts of nature. Impairment of digital movements after fractures is probably often due to coincident rupture or laceration of muscles, which might have been repaired by suturing with catgut, if the surgeon had known of the existence of the complication. The aseptic wound affords him this opportunity; and afterward usually heals so rapidly that it is of no disadvantage to the patient's period of

convalescence. This early restoration of wage-earning capacity is of great value to many patients.

10. It not infrequently happens that a closed fracture seems to have been well set, and to have left little deviation from the normal; and yet the patient has lost some of his availability as a machine. This is most likely to occur in the lower limb which, during locomotion, carries the entire weight of the man. A slight change in the axis of a bone or in the plane of an articulating surface may perhaps throw the weight upon the hip, knee, or ankle in an abnormal way and induce a considerable and ever increasing disability. This contingency is usually avoidable after the accurate inspection of the injured bone permitted by uncovering the fracture by incisions.

In vicious union of fractures due to absence of treatment, or to injudicious treatment, I believe that it is sometimes much better to expose the seat of deformity and divide the deformed bone with an osteotome than to refracture subcutaneously by an osteoclast or the surgeon's hands. Many cases can indubitably be well treated by refracture without incision or by subcutaneous osteotomy; but if there be a reasonable doubt as to one of these methods enabling the surgeon to accomplish relief of the deformity, free exposure, such as I have just been advocating in recent fractures, is the proper treatment.

A similar method of dealing with luxations which are not readily reduced by manipulation under anesthesia is, in my opinion, preferable to a long continuance of unsuccessful manipulations, the application of great power by apparatus, or a relinquishing of the attempt to restore the integrity of the joint. It is true

that in all dislocations, except those of the spinal column and the backward luxation of the second phalanx of the thumb, reduction is usually readily accomplished by skilful manipulation under anesthesia, provided the attempt is made while the injury is recent. My contention is that in recent dislocations, when this is not the case, and in old dislocations, arthrotomy should be promptly done. No surgeon would recommend allowing the displacement to remain without attempting reduction; and I believe that compound pulleys or other methods of applying great force are usually more risky than prompt and thorough exposure by incision. Immediately before making the incision it would be well in most cases to make a final effort to reduce by manipulation; but this should not be carried to a sufficient extent to cause much bruising or muscular laceration. The presence of such traumatism would increase the liability to septic processes, if imperfect asepsis allowed germs to gain access to the wound during the operation.

Arthrotomy for irreducible dislocation is not a novel suggestion, for it has been repeatedly done by many surgeons in old injuries. It has not, however, I think, been often adopted until after vigorous efforts have been made to subcutaneously replace the separated articular surfaces. Its use in luxations a few hours or a few days old, except perhaps in the fingers and toes, is probably almost unknown as an accepted surgical procedure. I believe it ought to be the approved treatment in a small number of cases. The advantages of the open method will at once be patent when the accidents that occasionally

follow the employment of the older methods are recalled. Fracture of the bone or laceration of artery, vein, or nerve, is only likely to occur when the region is not exposed to the operator's eye. In case of impossibility to properly reduce the dislocation, moreover, the end of the luxated bone can be excised. This will probably nearly always give a better functional result than to allow the previous condition to persist. Excision is not infrequently required after attempts to reduce old luxations without incision have proved unavailing. In an attempt to reduce an old luxation of the humerus I have displaced the head of the bone in such a way that it rested on the brachial plexus and caused more trouble than the original deformity. This would not have been the result, I think, if I had exposed the luxated bone by arthrotomy. If the open treatment is to be adopted it is evident that the patient will receive the greatest advantage if it be instituted before the head of the bone is altered in shape, the socket changed, and muscles and fasciæ contracted or adherent to surrounding tissues. The open method in addition gives opportunity to divide any ligaments, tendons, fasciæ and muscles which restrain reduction, to scrape out any material filling the socket, and to make provision for preventing recurrence of dislocation by retrenching the capsule or other plastic measures.

Skiagraphy may have a field in this department of surgery, as in fractures, by indicating the character of the luxation before the incision is made. It may perhaps be urged to this plea for a more general employment of exploratory incision in closed fractures

and dislocations that there are great objections to making a closed lesion of the osseous system an open one.

I know of no objection except the risks inherent in anesthesia, the possibility of infection, the occurrence of serious bleeding, and the production of ankylosis. The objections are of no force when the injury is one requiring exploratory incision. Anesthesia will have been used in such instances for diagnosis or attempted reduction. Its moderate prolongation for the necessary time will add practically nothing to the risk. Bleeding is no contraindication except in that rare condition, hemorrhagic diathesis. Ankylosis is more liable to occur from displaced fragments or articular surfaces, irregular callus due to stripped up periosteum, and interference with articular contact, than from aseptic incision into the joint and readjustment of the joint structures. The possibility of infection is, then, the only factor that requires consideration. Fifteen or twenty years ago, even subcutaneous tenotomy at the heel, recommended by the surgeons of the Pennsylvania Hospital in cases of marked displacement after fractures of the tibia, was undertaken with some hesitation. Now operative infection in muscular and osseous lesions is so preventible and so readily managed by prompt action that it is no longer a valid objection to incision in a closed fracture or dislocation, if functional disability is liable to occur unless this operation is performed. For some years it has been the practice of surgeons to incise open fractures freely in order to thoroughly cleanse the deep recesses, obtain an antiseptic condition of the lesion,

and get rid of effused blood. An extension of operative surgery is, in my opinion, now warranted in closed fractures and dislocations in which ordinary methods of reduction prove unavailing or unsatisfactory.

BIBLIOGRAPHY.

- ¹ "Trans. Am. Surgical Asso.," vol. iii (1885), pp. 6 and 105.
- ² "Trans. Am. Surgical Asso.," vol. x (1892), p. 58.
- ³ MEDICAL NEWS, November 21, 1891, p. 590.
- ⁴ "Trans. Clinical Society of London" (1894), p. 167.
- ⁵ "Annals of Surgery," May, 1896.
- ⁶ "System of Surgery," vol. i.
- ⁷ "*Traité de Chirurgie*," Duplay & Reclus, ii, 376.
- ⁸ "Annals of Surgery," April, 1895, p. 457, and "Philadelphia Polyclinic," August 21, 1896.

The Medical News.

Established in 1843.

A WEEKLY MEDICAL NEWSPAPER.

Subscription, \$4.00 per Annum.

The American Journal

OF THE

Medical Sciences.

Established in 1820.

A MONTHLY MEDICAL MAGAZINE.

Subscription, \$4.00 per Annum.

COMMUTATION RATE, \$7.50 PER ANNUM.

LEA BROS & CO.,

NEW YORK AND PHILADELPHIA.